force of gravity is one of those which aids the circulation; that "all those vessels which carry blood *to* a capillary system are called arteries;" that in "scaly amphibia"—by which we assume reptiles are meant—the two ventricles always communicate, which is not true as far as the crocodiles and alligators are concerned; and that the heart of a warm-blooded animal, removed from the body, will continue to beat "so long as a supply of oxygenated blood is provided."

The term "secretion" in its widest sense is said to denote "all those processes in which substances quit the blood in an altered or unaltered condition." This involves the inclusion of that simple nutritive diffusion into tissues which results in the origin and growth of bone, cartilage, &c.; an unnecessary complication, we cannot help thinking, and one apt to mislead. When it is stated that "nothing is known about the formation and regeneration of bone-tissue, except the morphological appearances presented in the various stages," justice is not done to Dr. Beale's most ingenious and highly probable explanation of the process by which it comes into existence.

The second portion of the work discusses the energetic relations of the body. Parts give indications of having been evolved from the author's inner consciousness, when he might have appealed to sound fact. On the whole we prefer the way in which the subject is treated in Dr. Pavy's excellent work on "Food." Prof. Hermann's theory of muscular contractility, based entirely on slender analogies, does not impress itself on our attention more than does the not less satisfactory one of Dr. Radcliffe.

The "liberating" or "discharging" apparatus, in other words the nervous system, occupies the third section of the work. As our knowledge of the nerves is very superficial, remarks the author, it must suffice to establish empirically the conditions which increase, diminish, or destroy irritability. This is done in a most exhaustive and excellent manner. Prof. Hermann regards the phenomenon of electrotonus as an effect of contact, the contents of nerve-tubes which are dying or in activity being negative to the contents of nerve-tubes which are living and at rest. The chapters on special sense will be read with particular interest, from the masterly manner in which they are written. Why so much space is devoted to the horopter, a surface the physical relations of which are as much connected with stereoscopic photograph cameras and double magic lanterns as with eyes, we do not know. With regard to the author's ideas on the recent views promulgated by Hitzig, Fritsch, Nothnagel, and Ferrier, we will quote his own words. "The movements which have recently been induced by electrical stimulation, since they do not occur after mechanical or chemical stimulation, may very well be set down to the irritation of more deeply seated regions, for the latter are unavoidably exposed to the diffusion of currents. . . . . No results as to the nature and distribution of the functions of the cortex, even of the value of approximations, can be deduced from these experiments."

In the fourth section of the work a short account is given of the development of the embryo, not detailed enough to be of much service, except to the initiated.

This rapid glance at the contents of Prof. Hermann's work indicates that it adopts a method of treatment that is more modern than most. In perusing it in detail the incorporation of the results arrived at in all directions by physiologists during the last twenty years, makes its value still further apparent. The many conflicting statements which have sometimes to be made, without any explanation being given, leave several questions without any definite answer. Such must for some time be the case in a science so young as physiology. The authorities for the different statements introduced are given in every case where there might be any doubt, and the book would have been still further serviceable if references had been introduced to the publications in which the results are described, as well as to the author's name. Many, in looking through the work, will feel that much of the method and many of the phenomena there explained, which, although they have not made their way into our text-books, have been current in the oral tradition of physiological circles; they must remember that a considerable amount of capital has been made out of foreign investigations by those who have done little more than dole them out in a different language from that in which they originally appeared.

The arduous task of translation has been most conscientiously performed by Dr. Gamgee, who has evidently weighed, carefully and acutely, the unavoidably difficult forms of expression employed, many necessarily quite new on account of the novelty of the conceptions developed. Taking for example the word "Schwellenwerth," as employed with reference to Fechner's psycho-physical law which is shortly explained; at the suggestion of Dr. Sanderson it has been translated "liminal intensity," an expression which does not at first sight explain itself, as does "initial intensity," the rendering which first occurred to Dr. Gamgee. In physics "initial" is employed of velocities, and we are not sure that any other term was necessary.

In conclusion, there is no doubt that the appearance of this work has greatly reduced the need, at the present time, for any other treatise on the Elements of Physiology.

WHITE CONQUEST

White Conquest. By William Hepworth Dixon. Two vols. (London: Chatto and Windus, 1876.)

MR. DIXON has been again in America, this time to collect evidences of the struggle between the races that is being waged on that wide battle-field. Although his method of treating the subject is not such as quite to bring his work within the critical sphere of NATURE, and although the author makes no attempt to treat his subject scientifically, still even the scientific reader, the student of ethnology or of the characteristics of the various races of men, and he who takes an interest in the struggle for existence wherever it is being carried on, will find much in Mr. Dixon's striking pictures well fitted both to interest and instruct. It is not in our province to criticise the quality of the artistic element in the work, but about its fascination there can be no doubt. Of course the work is one-sided. We do not use the term by way of depreciation, but in its literal sense. Mr. Dixon's aim is to represent, by means of a

© 1875 Nature Publishing Group

series of sharply outlined and brilliant pictures, the most prominent and often the most unpleasant features of the great struggle out of which it is evident the white race must come victorious.

The regions with which the work is mainly concerned are the Pacific States, especially California, and also the States on the Gulf. In the West, especially, the fight is a regular *mêlée* between white men, red men, black men, and yellow men. Very striking indeed is Mr. Dixon's account of the means by which the Chinese are rapidly asserting for themselves a place of the first importance in and around San Francisco, notwithstanding the disgusting and degrading habits of the majority of them.

When the heat of the struggle is over, when the country is again sufficiently populated, and the people have settled down to a life of steady progress, what will be their characteristics, physical, intellectual, and moral? It is an interesting question, an intricate problem, which we fear it would be difficult to work out beforehand. In a recent number we referred to the valuable paper by Prof. Wilson, of Toronto, detailing his observations on the relations between the whites and the Indians, especially in Canada. His conclusion is, that in accounting for the disappearance of the American Indian, too much prominence has been given to extermination and too little to absorption. He produces data to show that a very considerable amount of red blood has been absorbed by the white intruders, and that aboriginal traces are to be found widespread among all classes of society. Moreover, that it is difficult to find a pure Indian, and that the half-breeds who now mainly represent the old proprietors of the soil have excellent stuff in them, and are being constrained gradually to settle down to a civilised life. The conclusion is, that in the end a homogeneous race will result, having no doubt large white characteristics, but at the same time showing unmistakeable marks of a red ancestry.

Where one race intrudes itself forcibly into a country already populated, and has to fight its way to find a place for itself, this mixture is inevitable; the men who do this rough work cannot as a rule take their own women with them. Some of the most impressive pictures in Mr. Dixon's work are connected with this subject, and show how inevitable it is that under the circumstances alluded to, a large half-breed population must arise. We are sorry to see, however, that Mr. Dixon does not speak so well of the half-breeds as Prof. Wilson does, though this may arise from the fact that those of Canada have as a rule more white blood than red in their veins. In the end, which approaches with accelerating speed, when homogeneity is attained, the United States will be populated by a race of very mixed blood indeed, though it is evident to everyone but a pessimist, that the brain and sinew and muscle which dominate in the Old World will, both in quality and quantity, in intension and extension, to use logical terms, bear the sway on the other side of the water. The great stumbling-block in this, as in other respects, in America, is the Negro, the "culled gemm'n," as he now calls himself. Extermination does not appear likely to be his fate, and "absorption" in his case seems a mighty long way off.

Two of the most interesting chapters in Mr. Dixon's works refer to education in America, and will somewhat surprise those who fancy that America has a system of education as thorough and uncompromising as that of Germany. While Mr. Dixon has evidently presented here almost exclusively the dark side of the education question in America, there is no withstanding his statistics. Still, all things considered, especially looking at the heterogeneous population, ever largely increasing from the outside, with which American educationists have to deal, both the extent and the quality of education in the United States do the citizens infinite credit.

While, we repeat, Mr. Dixon's work makes no pretensions to be scientific, still we are grateful to him for bringing before us so brilliant and attractive a series of pictures of a struggle which is indeed only the continuation, further westwards, of that which was begun far back in prehistoric times by the ancestors of those whites who at present seem likely to be victors and lords all the world over. We fear that after all, however much we may plume ourselves on our superior culture and advanced civilisation, might is still with us, as with our predecessors, right; and perhaps after all, both on scientific and humanitarian grounds, it is only right that it should be so.

OUR BOOK SHELF

Elementary Analytical Geometry. By the Rev. T. G Vyvyan. (London: George Bell and Sons, 1875.)

Conic Sections treated Geometrically. By W. H. Besant, F.R.S. (Same publishers.)

THERE is little calling for special notice in Mr. Vyvyan's work. The fact of its having reached a third edition is a clear indication that it has met with acceptance. New chapters have been added on focal properties of conics and on abridged notation and trilinear co-ordinates; the central conics are discussed together; and the chapter on the general equation has been enlarged. There is a good selection of exercises. The work is reduced in price, and now forms one of the publishers' series of Cambridge School and College Text Books.

The new matter in this second edition of Mr. Besant's "Conics" is confined to little more than two articles. The errata of the first edition have been carefully removed, and we have detected only some half-dozen simple typographical mistakes. Between thirty and forty new examples have been added. We notice that in consequence of a few slight alterations, in some four or five cases, the same figures come on to opposite pages, a fact easily accounted for when we know that the work is now in its second edition.

We presume that though Mr. Besant in his Introduction still states that "a knowledge of Euclid's Geometry is all that is necessary," he does not thereby mean us to infer that a like knowledge of geometry obtained from other and more modern text-books would not answer as well. It is not necessary to say anything in praise of a work so well known and prized as this as a text-book of Geometrical Conics.

Die Periodischen Bewegüngen der Blattorgane. Von Dr. W. Pfeffer, A.O. Professor in Bonn. Mit 4 lithographirten Tafeln und 9 Holzschnitten. (Leipzig: verlag von Wilhelm Engelmann, 1875. 8vo., 176 pp.) (The Periodic Movements of Leaf-organs. By Dr. W. Pfeffer, Extraordinary Professor in Bonn. With 4 lithographed plates and 9 woodcuts. Leipzig: W. Engelmann.)

THE essential character of periodic movements as defined by Pfeffer is their being recurrent. All "repeated" movements, whatever their cause and mechanism may be, are periodic. Recurrent or periodic movements are of diffe-

© 1875 Nature Publishing Group